



City of Liberty Lake Engineering Design Standards

Adopted by the City of Liberty Lake City Council
by Ordinance # 241

Exhibit A3



Acknowledgements

The City of Liberty Lake would like to acknowledge the City of Cheney for their assistance in this development manual, including background materials and standard drawings.



City of Liberty Lake Engineering Design Standards





Table of Contents

Section 1 - Overview

1.1 Purpose and Scope	1-2
1.2 Definitions	1-2
1.3 References.....	1-7
1.4 Design Variance Requests.....	1-8
1.5 Pre-Development Conference.....	1-8
1.6 Intake Meeting	1-9
1.7 Permits and Licenses.....	1-9
1.8 Additional Requirements.....	1-9
1.9 Material Acceptance	1-9
1.10 Amendments; Process and Authority	1-9
1.11 Environmental Checklist	1-10
1.12 Transportation Analysis	1-10
1.13 Land Use Compliance.....	1-10
Attachment 1.1 Request for Design Variance	1-11

Section 2 – Project Application & Certification

2.1 Design Review Submittals	2-2
2.2 Infrastructure Project Submittal Requirements.....	2-2
2.3 Construction Certification.....	2-4
2.4 Penalties	2-7
Attachment 2.1 – Agreement to Pay Fees	2-8
Attachment 2.2 – Construction Phase Services.....	2-9
Attachment 2.3 – Project Acceptance Flow Chart.....	2-10
Attachment 2.4 – Minimum Testing Frequencies	2-11
Attachment 2.5 – Final Certification Checklist (Sample)	2-12

Section 3 – Streets, Alleys, & Bikeways

3.1 Right of Way	3-2
3.2 Roadways and Alleys.....	3-2
3.3 Curbs, Gutters, Pedestrian Buffer Strips, Driveways and Sidewalks	3-10
3.4 Signing and Illumination.....	3-14
3.5 Clearances / Clear Zones	3-15
3.6 Bikeways and Off-Road Pathways.....	3-15
3.7 Pavement Cuts and Patches.....	3-16

Section 4 – Stormwater Management

4.1 Methods of Stormwater Conveyance and Disposal	4-2
4.2 Stormwater Drainage in the Public Right of Way	4-2

Section 5 - Inland Northwest Pavement Cut Policy

5.1 The policy is available at Public Works	
---	--



Standard Detail Index

A. Streets, Alleys, & Bikeways

Roadway Section - Curbed.....	A-1
Curbs and Gutters.....	A-2
Urban Driveways – Separated Sidewalks.....	A-3
Curb Ramp.....	A-4
Traffic Island.....	A-5
Cement and Concrete Approaches.....	A-6
Rural Road Approaches.....	A-7
Rural Driveway Approaches.....	A-8
Bike Ways & Pedestrian Paths.....	A-9
Cul-De-Sacs – Public Roads.....	A-10
Cul-De-Sacs – Private Roads.....	A-11
Sidewalk Retaining Wall.....	A-12
Retaining Wall.....	A-13
Monument Case & Cover.....	A-14
Street Name Signs.....	A-15
Sign Posts.....	A-16
Clearview Triangle.....	A-17

B. Stormwater System

Precast Drywells.....	B-1
Precast Drywell Details.....	B-2
Precast Drywell and Inlet Details.....	B-3
Catch Basin Type 1.....	B-4
Concrete Inlet Type 1.....	B-5
Concrete Inlet Type 2.....	B-6
Catch Basin and Inlet Installation.....	B-7
Curb Inlet Type 1.....	B-8
Curb Inlet Type 2.....	B-9
Metal Frame Type 1.....	B-10
Metal Frame Type 2.....	B-11
Metal Grate Type 1.....	B-12
Metal Grate Type 2.....	B-13
Metal Grate Type 3.....	B-14
Metal Frame, Grate & Solid Cover – Type 4.....	B-15
Concrete Gutters.....	B-16
High Volume Driveway Approach.....	B-17
Swale Section with Modular Block Wall.....	B-18
Storm Drain Manhole Cover.....	B-19

City of Liberty Lake Design Engineering Standards



Section 1 Overview



1.0 OVERVIEW

1.1 Purpose and Scope

- A. These Standards establish uniform requirements to promote the public safety, welfare, convenience, aesthetics and economical maintenance of public and private improvements.
- B. These Standards are minimum design standards. It is expected that land surveyors, engineers, architects, and landscape architects will exercise best efforts to ensure that the project is designed in a manner consistent with the intent of the Standards.
- C. These Standards do not prohibit innovative efforts which could achieve the intent and purpose of these Design Standards through an alternative solution. Accordingly, the design deviation process allows variance from these Standards; provided such design variance produces a compensating or comparable result.
- D. These Standards shall govern the design of new construction and improvements to all streets, sewers, water lines and other utilities installed in the City of Liberty Lake.
- E. If any part of these Standards is found to be invalid, all other non-conflicting parts shall remain in effect.
- F. For items not addressed in these Standards, design and construction shall conform to the most current edition of the Washington State Department of Transportation's Standard Specifications for Road, Bridge and Municipal Construction.

1.2 Definitions

- A. The following definitions apply to terms and abbreviations used throughout this manual. Additional terms applicable to specific aspects of design are defined at the beginning of other sections.
 - 1. **AASHTO** The American Association of State Highway Transportation Officials. The abbreviation may also be used throughout these Standards to reference AASHTO's publication, "A Policy on Geometric Design of Highways and Streets".
 - 2. **ADA** Americans with Disabilities Act.
 - 3. **ADAAG** Americans with Disabilities Act Accessibility Guidelines.
 - 4. **Alley** A public or private way designed or intended to provide rear access to properties having frontage on a public street. Alleys are generally not intended for through vehicle movements.
 - 5. **Applicant** An individual or firm applying for design approval from the City for a project.
 - 6. **APWA** The American Public Works Association.
 - 7. **AWWA** The American Water Works Association.
 - 8. **Center Crown** A street cross-section with the highest point of the traveled way located at the center of the street.
 - 9. **Clear Sight Triangle** The corner area at an intersection or driveway which must be free of sight obstructions over 36 inches in height to provide adequate sight distance.



10. **Clear Street Width** The width of a street from curb to curb (or other obstruction) minus the width of on-street parking lanes.
11. **Clear Zone** The unobstructed, relatively flat area provided beyond the edge of the traveled way for the recovery of errant vehicles.
12. **LLMC** Liberty Lake Municipal Code.
13. **Collector Arterial** A relatively low speed street serving an individual neighborhood. Collector arterials are typically low speed, two-lane roads with on-street parking; their function is to collect and distribute traffic from local access streets to minor arterials.
14. **Corner Radius** The radius of a street corner, as measured around the curb or edge of pavement.
15. **Critical Aquifer Recharge Areas** - Areas where there is an aquifer that is a source of drinking water that is vulnerable to contamination that would affect the potability of the water (WAC 365-190-030).
16. **Critical Areas** - Include the following areas and ecosystems: (a) Wetlands; (b) areas with a critical recharging effect on aquifers used for potable water; (c) fish and wildlife habitat conservation areas; (d) frequently flooded areas; and (e) geologically hazardous areas. (Defined in 36.70A.030(5) as now or hereafter amended.)
17. **Cross Slope** A slope that is perpendicular to the direction of travel.
18. **Crown (Street Crown)** The term used to define the highest point of the traveled way on a street cross-section. The City recognizes three types of street sections to facilitate drainage: center crown, quarter crown and curb crown, which are defined herein.
19. **Curb Cut** - A driveway opening where a curb is provided along a street.
20. **Curb Crown** A street cross-section with the highest point of the traveled way located at one curb.
21. **Curb Ramp** A ramp constructed in the sidewalk to allow wheelchair access from the sidewalk to the street.
22. **Day(s)** - Shall mean calendar days unless otherwise specified and shall be computed pursuant to RCW 1.12.040 or as amended.
23. **Designer** The project engineer or architect.
24. **Design Variance** A grant of relief from the requirements of this section that permits construction in a manner that would otherwise be prohibited by these design standards.
25. **Developer** Refers to the owner (or financial sponsor) of a privately funded project. May also be taken to mean the owner's consulting architect, engineer or other agent.
26. **Drive Lane/Travel Lane** - An improved (e.g., paved) driving surface for one line of vehicles.
27. **Driveway** Areas that provide vehicular access to a site, except for public and private streets. A driveway begins at the property line and extends into the site. Driveways do not include parking, maneuvering, or circulation areas in parking space areas.
28. **Driveway Apron / Approach** - The edge of a driveway where it abuts a public right-of-way; usually constructed of concrete.
29. **Easement** - A right of usage of real property granted by an owner to the public or to specific persons, firms, and corporations.
30. **Engineer** The City of Liberty Lake City Engineer or Designee.
31. **Frontage** - The dimension of a property line abutting a public or private street.



32. **Functional Classification** - The classification given to streets (e.g., "local/collector/arterial") by the City's Comprehensive Plan, by adopted County plans, and Washington State Department of Transportation.
33. **Grade** - The average elevation of the finished ground level.
34. **Grading** - Excavation or fill or any combination thereof, including but not limited to the establishment of a grade.
35. **Hammerhead Turnaround** - A "T" or "L" shaped dead-end street that allows for vehicles to turn around.
36. **Hard Surface** - A hard surface shall consist of asphalt, Portland cement concrete, crushed rock, grass pavers, or other technologies laid to the specifications set forth by the City Engineer and this Code.
37. **High Occupancy Vehicle (HOV)** - A motorized vehicle carrying 2 or more passengers.
38. **Impervious Surface** - Development which does not allow for water infiltration (e.g., pavement, roofs, etc.).
39. **Integral Curb and Gutter** Concrete curb and gutter which is formed and placed as one unit.
40. **Isolated Wetlands** - Those wetlands which are outside of and not contiguous to any one hundred year floodplain of a lake, river, or stream; and have no contiguous hydric soil or hydrophytic vegetation between the wetland and any surface water.
41. **Lane** - A private road allowing ingress and egress to a parcel of land which may or may not have minimum lot frontage on a public street, road, or right-of-way.
42. **Level of Service (LOS)** - LOS standards are an indicator of the extent or quality of service provided by a facility that is related to the operational characteristics of the facility. They are a summary of existing or desired public service conditions. The process of establishing level of service standards requires the City to make quality of service.
43. **Local Access Street** A street that provides access from individual properties to collector and minor arterials. Refer to the Arterial Street Plan portion of the City's Comprehensive Plan for additional discussion.
44. **Median** A painted or raised traffic island used to channel, separate and otherwise control vehicular traffic.
45. **Minor Arterial** A two to four lane facility which collects and distributes traffic between arterials. Refer to the Arterial Street Plan portion of the City's Comprehensive Plan for additional discussion.
46. **Monument** A physical survey monument.
47. **MUTCD** The U.S. Department of Transportation Manual on Uniform Traffic Control Devices.
48. **One Hundred (100)-Year Flood Plain** - An area determined by the Federal Emergency Management Agency (FEMA) or by the City of Liberty Lake to have a 1% chance of flooding in any given year.
49. **Owner** The legal owner of the property on which a project is to be constructed.
50. **On-Site Project** A private project. The term "on-site" is used to describe an area outside the public right of way.
51. **Pedestrian Buffer Strips** Hard surfaced or landscaped areas between travel or parking lanes and sidewalks, also called Planting Strips. Pedestrian Buffer Strips improve safety by separating vehicles and pedestrians and provide space for drainage and snow storage.
52. **Pedestrian Walkway** – A surfaced walkway, separate from the traveled portion of a public or private right-of-way or parking lot / driving aisle.



53. **Planned Unit Development (PUD)** - A land development project planned comprehensively as an entity through a design process prescribed by ordinance that permits some flexibility in the regulations of the underlying zone.
54. **Private Project** A project which is to be constructed on privately-owned property.
55. **Private Streets** Streets which are not controlled or maintained by a public authority, and which serve two or more properties.
56. **Public Project** A project which is to be constructed within the public right-of-way or public property. Public projects may be designed by either private consultants or the City's in-house engineering staff.
57. **Public Right of Way** - Any sidewalk, planting strip, alley, street, or pathway, improved or unimproved, that is dedicated to public use. Land that is owned in fee simple by the public, usually for transportation facilities.
58. **Qualified Wetlands Specialist** - The holder of SWS (Society of Wetland Scientists) certification or has the equivalent in academic qualifications and field experience for making competent wetlands delineations and reports and recommendations necessary to implement the provisions of Chapter 6.
59. **Quarter Crown** A street cross-section with the highest point of the traveled way located at a distance from one curb of one-fourth the street width (as measured from face of curb to face of curb).
60. **Queuing Area** A length of public or private street on the public side of an entrance gate that allows vehicles to exit the connecting street prior to the gate.
61. **RCW** Revised Code of Washington.
62. **Riparian Wetlands** - The transitional area between aquatic and upland ecosystems that is identified by the presence of vegetation that requires or tolerates free or unbound water or conditions that are more moist than normally found in the area.
63. **SEPA** State Environmental Policy Act.
64. **Shall** - As used in this Code, is mandatory.
65. **Specifications** Defined as the most current versions of the following documents:
 - a. City of Liberty Lake Development Manual
 - b. WSDOT Standard Specifications for Road, Bridge and Municipal Construction and the amendments thereto.
 - c. Washington State MUTCD
 - d. Spokane Regional Stormwater Manual
 - e. AWWA
66. **STA** Spokane Transit Authority..
67. **Standards and Criteria** - Standards are code requirements. Criteria are the elements required to comply with a particular standard.
68. **Standard Plans** The City of Cheney Standard Plans set forth herein.
69. **Steep Slopes** - Slopes of greater than 15 percent depending on soil conditions.
70. **Street Classification** Arterial and local access streets, as classified in the Transportation portion of the City's Comprehensive plan as follows:
 - a. Minor Arterial
 - b. Collector Arterial
 - c. Local Access StreetDefinitions of all of the above classifications are included herein. Private streets are not classified.



71. **Stormwater Drainage Facility** - Constructed and natural features which function together as a system to collect, convey, channel, hold, inhibit, retain, detain, infiltrate, evaporate, divert, treat or filter stormwater. Stormwater facilities include, but are not limited to, pipes, ditches, culverts, street gutters, detention ponds, retention ponds, evaporation ponds, constructed wetlands, infiltration devices, catch basins, oil/water separators, and swales.
72. **Street / Road** - A public or private way for travel by vehicles, bicycles, and pedestrians that meets the City standards in Article 10-3G.
73. **Street Access** - See Article 10-3B & Article 10-3G.
74. **Street Connectivity** - The number of street connections within a specific geographic area. Higher levels of connectivity provide for more direct transportation routes and better dispersion of traffic, resulting in less traffic on individual streets and potentially slower speeds through neighborhoods.
75. **Street, Local Access** - Street classification per the Spokane County Road Standards.
76. **Street, Public (private)** - A public or private thoroughfare which affords primary means of access to abutting property and whose legal description of is recorded with the County Auditor. A recorded private thoroughfare may be a recorded easement for ingress or egress or a platted street designed as a private thoroughfare for access of abutting property but for which the City assumes no responsibility or ownership and is available for use to the abutting property owners only. The private road easements and road maintenance agreements shall meet the requirements of the adopted public or private road standards for the city of Liberty Lake, as amended. The private road easements and associated maintenance agreement shall be recorded with the County Auditor prior to final subdivision or segregation by Certificate of Exemption.
77. **Street Stub** - A temporary street ending; i.e., where the street will be extended through adjacent property in the future, as those properties develop. Not a permanent street-end or dead-end street.
78. **Structural Sidewalks** Structural sidewalks shall be defined as all elevated slabs, grates, and panels located within a sidewalk or driveway not supported on grade. Typical examples of elevated structural sidewalks are concrete slabs, steel grates, and steel plates for utility vault lids, service elevator covers, and utility covers.
79. **Swale** - A type of storm water facility. Usually a broad, shallow depression with vegetation that filters and processes contaminants.
80. **Tangent** - Meeting a curve or surface in a single point.
81. **Traveled Way** The area of street which is intended to carry vehicular traffic, including any shoulders.
82. **Vacate Plat/Street** - To abandon a subdivision or street right-of-way. For example, vacation of a public right-of-way that is not needed or cannot be used for a street or other public purpose. A plat may be vacated, returning the property to an undivided condition.
83. **Vision Clearance Area** - See Section 10-3B-2, subsection N.
84. **Washington Administrative Code (WAC)** Current administrative regulations created by the State of Washington to carry out the laws passed by the State Legislature.
85. **Wetland(s)** - Areas that are inundated or saturated by surface water or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in



saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas. Wetlands do not include those artificial wetlands intentionally created from nonwetland sites, including, but not limited to, irrigation and drainage ditches, grass-lined swales, canals, detention facilities, wastewater treatment facilities, farm ponds, and landscape amenities, or those wetlands created after July 1, 1990, that were unintentionally created as a result of the construction of a road, street, or highway. Wetlands may include those artificial wetlands intentionally created from nonwetland areas created to mitigate conversion of wetlands. (Defined in RCW 36.70A.030(20) as now or hereafter amended.)

86. **Wetland Banking** - The off-site created, restoration, and/or enhancement of wetlands to compensate for unavoidable wetlands impacts associated with development. The newly created or restored site functions as a "bank" which can issue credits to compensate for future wetland impacts.
87. **Wetland Buffer or Wetland Buffer Area** - An area that surrounds and protects a wetland from adverse impacts to the functions and values of a wetland. The buffer width shall be determined according to the rating assigned to the wetland in accordance with Section 10-6B-3. Buffer width is measured outward from the wetland boundary.
88. **Wetlands Delineation Manual** - The 1987 U.S. Army Corps of Engineers Wetland Delineation Manual used in conjunction with the "Washington Regional Guidance on the 1987 Wetland Delineation Manual" dated May 23, 1994, as amended or any other wetlands delineation adopted or recommended for use by the Washington State Department of Ecology.
89. **Wetlands of Local Significance** - Wetlands evaluated by established criteria and given a higher designation as either class 1 or class 2 wetlands.
90. **Wetlands Permits** - Any permit, modification, revision, or variance issued, conditioned or denied pursuant to Section 10-6B-3.
91. **Wetland Types** - The wetland classes or subclasses of the wetlands taxonomic classification system described in the U.S. Fish and Wildlife Service's Classification of Wetlands and Deepwater Habitats of the United States, FWS/OBS-79/31 (Cowardin et al., 1979 or hereinafter amended).
92. **WSDOT** Washington State Department of Transportation.

1.3 References

- A. Except where these Standards provide otherwise, design, detail, workmanship, and materials shall be in accordance with the current editions of the following publications:
 1. Standard Specifications for Road, Bridge, and Municipal Construction as amended. (Published by WSDOT).
 2. Spokane Regional Stormwater Manual.
 3. WSDOT Standard Plans for Road and Bridge Construction..
 4. WSDOT Design Manual.
 5. WSDOT Hydraulics Manual.
 6. NRCS Urban Hydrology for Small Water Sheds TR-55.
 7. Department of Transportation Manual on Uniform Traffic Control Devices, as amended (MUTCD).
 8. A Policy on Geometric Design of Highways and Streets (AASHTO).



9. Americans with Disabilities Act Accessibility Guidelines for Buildings and Facilities (ADAAG). (Published by the U.S. Architectural and Transportation Barriers Compliance Board).
10. Spokane Transit Authority Design Guidelines.
11. City and County Design Standards for the Construction of Urban and Rural Arterials and Collectors, Washington State. (Published by WSDOT.)

1.4 Design Variance Requests

- A. To gain approval for a variance from these Design Standards, the Applicant shall submit a "Request for Design Variance" to the Public Works Department. The Design Variance shall state the standard(s) to be varied, including the proposed variance(s) and the reason(s) for the request. Additional supporting information plans or design data prepared by a professional engineer, licensed in the State of Washington should be included as needed or requested.
- B. Design variances may be granted by the City Engineer, in the exercise of reasonable judgment, upon evidence that such design variance is in the public's best interest to include satisfying requirements for safety, function, appearance, maintenance, uniform code compliance in conformance with the intent of these Standards.
- C. Design variances should be approved prior to construction. To the extent known, the variance should be proposed at the preliminary design stage and included for consideration during plan review and public hearing.
- D. Attachment 1.1 contains the Design Variance Application.

1.5 Pre-Development Conference (See City Development Code)

- A. A pre-development conference is an opportunity for the Applicant to present the project and receive comment from various departments on adopted codes, policies, or laws of the State, or the City of Liberty Lake. No development approvals are granted at the conference.
- B. Pre-development conferences must be scheduled with the City of Liberty Lake Permit Center.
- C. The following items are required for a conference:
 1. Completed pre-development conference application
 2. Six copies of the proposed site plan, to scale, depicting the following, as applicable:
 - a. Property lines
 - b. Existing and proposed buildings, parking areas and other site improvements
 - c. Proposed driveways
 - d. Proposed connections to public sewer and water
 3. Six copies of the proposed building plans showing reasonable detail to assist city staff in making recommendations to the Applicant.
 4. For additional information regarding the Pre-Development Conference contact Liberty Lake's Permit Center.



- D. There is no charge for the first Pre-Development Conference. Additional Pre-Development Conferences for the same parcel(s) and the same applicant(s) will be subject to a fee.

1.6 Intake Meeting

- A. Certain projects may require an Intake Meeting. The purpose of this meeting is to allow City departments to review the application and all of the submittal requirements. An Intake Checklist may be obtained at the City of Liberty Lake Permit Center.

1.7 Permits and Licenses

- A. Applicants are responsible to acquire all permits and licenses necessary for the completion of the project. The City of Liberty Lake will not be held responsible, financially or otherwise, for any delay or additional expenses the Applicant may incur due to City requests for, and review of, information necessary to issue permits and licenses.
- B. The City makes no warranty or representation concerning review of the information, plans and documents submitted by Applicant with Applicant solely responsible, as a condition of permit issuance, to ensure that all design and construction is: (a) based upon reasonably acceptable engineering practices; (b) performed with due care and caution and (c) suitable for its intended purpose. Through review of information, plans and documents, the City does not intend to create a special duty or relationship with the Applicant, Owner or others concerning the project.

1.8 Additional Requirements

- A. If public utilities or infrastructure will be constructed, the City may require the applicant to arrange for a "Pre-Construction Conference" through the Public Works Department, to include the Contractor, Applicant, Engineer and City staff.

1.9 Material Acceptance

- A. For public utilities or infrastructure construction, the Applicant shall provide the City with a list of all materials used on the project. The materials shall meet City specifications through supplier's verification, materials testing reports or reports stamped and signed by a professional engineer.
- B. All reports, materials verifications and other documents submitted to the City for acceptance shall be stamped and signed by a Professional Engineer licensed in the State of Washington.

1.10 Amendments; Process and Authority

- A. The City Council has the authority to approve all amendments to these Design Standards. Noted errors or suggested revisions to these Standards should be addressed to the City's Public Works Department.



1.11 Environmental Checklist (See City Development Code)

- A. The State Environmental Policy Act (SEPA) chapter 43.21C RCW, requires all governmental agencies consider the environmental impacts of a proposal before making decisions. The SEPA environmental checklist, together with the SEPA rules contained in chapter 197-11 WAC are used as guidelines to assess the probable environmental impact of any development which is not otherwise exempt from the review. Use of the SEPA checklist provides information to help the developer reduce or avoid impacts from the proposal and to help the agency determine whether mitigation or an environmental impact statement (EIS) is required. Mitigation is based upon project information, comments, studies, governmental policies and these Standards. An EIS may be required for proposals with probable significant adverse impacts on the environment.

1.12 Transportation Analysis (See City Development Code)

- A. For all projects anticipated to generate more than 200 trips per day or peak traffic of 50 trips or more, a Traffic Distribution Letter, certified by a Washington State licensed engineer will be required in the project submittal. For projects that generate more than 1000 vehicle trips per day, a traffic analysis report, certified by a Washington State licensed engineer, will be required in the application. The City Engineer may also require a traffic analysis on any project that has the potential to cause a decline in the adopted level of service standards for the affected transportation facilities. Specific scoping for the traffic analysis shall be determined by the Public Works Director either at the predevelopment conference or during project review.
- B. Harvard Road Mitigation is also an acceptable form of traffic impact mitigation.
- C. The applicant shall be responsible for the cost of the traffic study and any mitigation required to maintain the level of service of the affected transportation facilities.
- D. Based on the transportation analysis, the City Engineer may require additional street improvements or facilities as a condition of project approval.

1.13 Land Use Compliance

Project review shall include an analysis of the proposed project to determine compliance with the Liberty Lake Municipal Code.



Attachment 1.1 - Request for Design Variance

Project Name: _____

Address: _____

List below the deviations from the City of Liberty Lake Design Standards you are proposing. For each variance requested, explain the reasons why City Standards cannot be met, and describe how the proposed variance will satisfy requirements for safety, function, fire protection, appearance and maintainability. Attach additional supporting information as needed.

Submitted by:
Name (please print) _____

Company _____

Signature _____ Date____/____/____

FOR CITY USE ONLY

____Approved ____ Denied

City of Liberty Lake Engineering Design Standards



Section 2 Project Application & Certification



2.0 PROJECT APPLICATION AND CERTIFICATION

The review process outlined below must be followed for all privately-developed sewer, water, street and storm drainage projects. Water and Sewer design shall meet the requirements of the Liberty Lake "Water and Sewer District". Projects on private property shall make submittals following the City of Liberty Lake Development Code.

2.1 Design Review Submittals

- A. Construction may not begin prior to City approval of all building permits, utility and infrastructure plans.
- B. Plan review fees are established by City Council Resolution.

Note: City of Liberty Lake Public Works provides review services only, and it does not design the project for the Applicant. The City reserves the right to: increase plan review fees and/or refuse to review any project which is not designed in accordance with the City of Liberty Lake's design standards.

2.2 Infrastructure Project Submittal Requirements

- A. Required for all projects
 - 1. Vicinity Map
 - 2. An index of plan sheets.
 - 3. Title Blocks including project name, street name, sheet limits (station numbers), type of improvement and whether improvements are public or private.
 - 4. All design plans shall be prepared, stamped, and signed by a professional engineer licensed in the State of Washington. Plans shall include the engineer's address and phone number.
 - 5. Drafting standards shall follow lines and symbols adopted by Spokane County and City of Spokane Standards (CCSS) conventions. All used symbols and line types shall be described in a legend to be located on a separate sheet at the beginning of the plan set or on each individual sheet.
 - 6. Font and lettering shall be legible to be easily read and understood by the reviewer. Submitted plans not meeting these criteria will be returned to the Designer to correct before the review process is started.
 - 7. Road alignments with 100' stationing. Stationing at each points of curve, tangent and intersection with appropriate ties to existing road surveys and stationing, section corners, quarter corners, and horizontal control.
 - 8. All existing utilities.
 - 9. North Arrow.
 - 10. Section, township, and range.
 - 11. Right of way lines, width of proposed road, intersecting roads, and existing road improvements with dimensions.
 - 12. All topographic features within right of way or future right of way limits and sufficient area beyond to resolve questions of setback, slope, drainage, access onto abutting property, and road continuations.
 - 13. Identification of all roads and adjoining subdivisions.



14. Utility sheets shall be a minimum scale of 1"=50'. A scale of 1"=20' may be required for urban arterial streets where detail is sufficiently dense to cause a "cluttered" drawing at a smaller scale.
15. Section and lot lines.
16. Easements – Provide dimensions and purpose for any proposed easements. Show recording information, purpose and width for any existing easements.
17. Other data necessary for the specific project.

Profile Elements (For drawings where a "profile" design is required).

1. Profile elements shall include the following:
 - a. Original ground line at 100' stations and at significant ground breaks and topographic features based on field measurement accurate within 0.1' on unpaved surface and 0.01' on paved surface.
 - b. A final road and storm drain profile. The stationing shall be the same as the horizontal plan, reading from left to right. It shall include stationing of points of curve, tangent, length and point of intersection of vertical curves, with elevations to 0.01'.
 - c. On a grid of numbered lines, a continuous profile shall be shown for both existing and proposed improvements.
 - d. Grade and vertical curve data, all profiles.
 - e. The datum used and all benchmarks, which must refer to established control when available.

B. Street

1. Required for all projects
 - a. Details including typical cross sections for all street plans and a detail for all street patches.
 - b. Profiles for curbed roads shall show the tops of both curbs and the centerline clearly labeled.
 - c. Signing and striping/ channelization plan. Street sign type and placement must be clearly located on the plan. Both existing and proposed signs shall be included.
 - d. Monuments are to be placed at every intersection, the beginning and end of every horizontal curve, on the roadway centerline at the end of every plat and at the center point of each cul-de-sac. The location of the monuments shall be clearly marked on the plan and plat.
 - e. Bearings on the road centerline, keyed to an associated plat map.
 - f. Curve data including radius, delta, arc length, and semi-tangent length, on all road centerlines and curb returns.
 - g. All found and referenced survey monuments.
 - h. Beginning, middle, and ending elevations of curb returns.
 - i. Pavement section design by a Washington State Licensed Engineer.
2. May be required
 - a. A traffic distribution letter shall be required for projects that generate more than 200 trips per day or peak traffic of 50 trips or more. The letter must be certified by a Washington State licensed engineer.
 - b. A traffic analysis shall be required for projects that generate more than 1,000 trips per day. A traffic analysis shall also be required for projects that have the potential to cause a decline in the level of service for the affected transportation facilities. The analysis shall be certified by a Washington



State licensed engineer. Scoping shall be determined by the City Engineer.

C. Storm Water Drainage

1. Required for all projects
 - a. Plan/ profile and detail sheet(s) for design using design and drafting standards detailed in these specification.
 - b. Grading and drainage plan showing finished contour elevations.
 - c. Drainage study and report with calculated flows, stamped by a Washington State licensed engineer. The drainage study shall be prepared in accordance with the Spokane Regional Stormwater Manual.
 - d. Show all existing and proposed drainage features, showing direction of flow, size, and kind of each drainage channel, pipe, and structure and other requirements as specified in the Spokane Regional Stormwater Manual.
 - e. Erosion and sediment control plan (ESC) with BMPs identified for stormwater control during and after construction. The erosion and sediment control plan is required for any project prior to issuance of any permits for the project. The ESC plan shall meet the thresholds in Chapter 2 of the Spokane Regional Stormwater Manual (SRSW). See Chapter 9 of the SRSW for required elements.
 - f. A Geotechnical Site Characterization Report shall be prepared in accordance with Chapter 4 of the Spokane Regional Stormwater Manual.

D. Traffic Control

1. Prior to construction a project traffic control plan may be requested by Public Works. The approved plans are subject to change by the City Engineer as needed to accommodate traffic conditions in the field. During an emergency situation the Contractor may change the traffic control plan but if not in an emergency any changes proposed by the Contractor must be submitted to Public Works for re-review. The Project Coordinator will be responsible to ensure the approved traffic control plan is setup prior to construction, the traffic control is implemented as per the plan approved by Public Works, and is maintained during the course of the project.

2.3 Construction Certification

Construction for all private projects is initiated and coordinated through the City's Public Works Department. Construction drawings shall be turned into final record drawings.

A. Introduction

1. The procedures for construction certification are to foster consistent high quality projects and to facilitate the subsequent transfer of ownership of the finished improvement to the City of Liberty Lake.

B. Project Coordination



1. Prior to the start of construction the Applicant will identify a Project Coordinator. The Project Coordinator shall be responsible for managing the day-to-day operations of the project including traffic control, City requests, project safety, and overall coordination. The Project Coordinator shall be the contact for City personnel.

C. Project Inspection / Certification

1. Prior to the start of construction the Applicant will identify the Project Engineer. The Project Engineer shall be a licensed Professional Engineer in the State of Washington. This Engineer or his/her representative shall be responsible to verify the project was constructed according to the City accepted plans and specifications and the construction methods resulted in a high quality product. An outline of Construction Phase Services is presented in Attachment 2.2 within this document.
2. City staff will make site visits intermittently during the construction of the project to verify progress and will periodically discuss inspection activities with the Project Coordinator.
3. The Project Engineer may be the Project Coordinator.

D. Project Reporting

1. The Project Engineer will submit to Public Works a weekly progress report. This will include a narrative of the construction completed this week, daily inspection reports and any field testing reports.
2. Prior to project acceptance the Project Engineer will submit a certification to Public Works. All lab and field testing reports shall be included. Test reports that show failing tests must have follow-up test reports that are acceptable. Any nonconforming issues shall be fully documented to include resolution. Construction as-builts shall be provided by the Project Engineer and submitted to Public Works. The as-builts shall also be submitted as per Section 2.3.I.

E. Construction Complaints

1. Complaints from citizens regarding the project shall be documented by the Project Coordinator and resolved. City of Liberty Lake personnel shall be notified of such complaints.

F. Drainage Swale Inspections

1. The Project Engineer will verify that the volume of each finished drainage swale equals or exceeds the designed volume of the swale at a six-inch depth. Additionally, the Project Engineer will verify that there is adequate and continuous grade from the road to the swale for the effective conveyance of runoff. Once the Project Engineer finds the swale acceptable he/she shall submit a signed and stamped report stating the swale is constructed as per the approved plans. The report shall be submitted in the Project Certification package. The Project Engineer and the City will monitor the performance of the swales during the construction and warranty period for proper percolation. Swales that do not percolate properly will require corrective work or measures by the Applicant.



G. Changes During Construction

1. Changes during construction that materially affect the scope of the project and/or the accepted individual lot plans must be submitted for review by the City. Minor changes do not need to be reviewed by the City, but must be documented in the daily and weekly inspection reports.
2. When changes to the design are necessary, Applicant shall be responsible for coordinating the proposed design changes with the Project Engineer. The Project Engineer shall forward the proposed plan change, together with related calculations, to the City's Public Works Department for review and acceptance prior to construction.

H. Project Acceptance of Completed Construction

1. At the completion of the project the Project Engineer shall make a final inspection to determine if the project is in substantial conformance with the approved construction documents or there are deficiencies in the work.
2. Once all deficiencies are corrected to the satisfaction of the Project Engineer a final inspection with the Project Engineer and Public Works staff shall be scheduled.
3. Once Public Works is satisfied, with the work as determined in the final inspection meeting, the Project Engineer shall submit a certification package, as described in attachment #5, with a letter requesting final acceptance of the project. If Public Works finds the project complete, a Notice of Substantial Completion shall be sent to the Project Engineer and the warranty period shall start. Any remaining work shall be completed pursuant to an agreed schedule with the Applicant responsible to correct damage done by a third party (e.g. utility companies, builders, landscapers, etc.).
4. If the certification package is incomplete or otherwise unacceptable, the Project Engineer shall be required to provide the missing documents before Public Works will issue the Notice of Substantial Completion. Public Works will review the completed certification package and issue a Notice of Substantial Completion, if appropriate. Once Public Works authorizes Substantial Completion the warranty period shall commence.

I. Record Drawings

1. During construction the Project Engineer (or Surveyor) shall record any changes to the accepted plans. The approved plans should be modified to show all changes made during construction. The modified plans shall be labeled "Record Drawings" and stamped and signed by the Engineer and have the following statement: "I have reviewed the construction of this project's improvements and to my knowledge find it to be in substantial conformance with the accepted plans and the City of Liberty Lake's standards except as noted."
2. The completed as-built drawings shall be submitted to Liberty Lake's Public Works as an electronic PDF file and in a CAD drawing. file compatible with the City's current system. The CAD drawing shall include three existing local monuments, surveyed to correspond with the project's coordinate system.

J. Warranty Bond



1. Prior to final acceptance of any public improvements the Applicant shall provide the City with a warranty bond in the amount specified by the City Engineer. The term of the Warranty bond shall be for two years from the date the City provides the Notice of Substantial Completion. The bond must automatically renew until the warranty deficiencies have been corrected. Once all deficiencies have been completed at the end of the warranty period the City Engineer shall issue a letter authorizing the release of the warranty bond.

2.4 Penalties

- A. Failure to comply with the plan review procedure outlined above may be cause for withholding or withdrawing approval of plans, forfeiture of bond or non-acceptance of work by the City.

ATTACHMENTS

- Attachment 2.1 – Agreement to Pay Fees
- Attachment 2.2 – Construction Phase Services Outline
- Attachment 2.3 – Flow Chart – Project Acceptance
- Attachment 2.4 – Minimum Testing Frequencies
- Attachment 2.5 – Final Certification Checklist - Sample



ATTACHMENT 2.1 - AGREEMENT TO PAY FEES

FILE NUMBER _____

This agreement is between City of Liberty Lake and _____, ("Applicant")
(name of person or entity)

whose interest in the project is _____,
(i.e. owner, agent, etc.)

as of this _____ day of _____, 20____. This agreement is for the project known as:

(project address, name or "plat name & phase" with file number)

The parties named herein, to include successors and assigns agree to the following:

1. To reimburse the City of Liberty Lake for project review and inspection fees based on actual costs incurred by the City of Liberty Lake. City fees, with an estimate, are provided through separate document. Fees will be billed monthly as accrued. Any amounts due, including any expenses incurred in the collection of an overdue account, must be paid prior to the City's acceptance of the project or issuance of any permit. If a project is approved and/or filed with a balance still owing, the unpaid balance shall be paid prior to the City authorizing construction.
2. Fees are due and payable as set forth on the City invoice.
3. Any invoices not paid within 30 days of the invoice date will be considered delinquent. If any outstanding balance on the account for this project is not paid within 30 days of the invoice date, no further reviews of the project documents will be conducted until the entire account balance is paid. Any balance not paid within 60 days of the invoice date may result in legal action or the initiation of referral to a collection agency. Applicant will be liable for any and all expenses incurred by the City for the collection of overdue accounts, including reasonable attorney fees.
4. The monthly billing should be sent to:

NAME / Attention: _____

COMPANY: _____

ADDRESS: _____

CITY: _____ STATE ____ ZIP _____

PHONE #: _____ PHONE # 2 _____

FAX #: _____

E-Mail #: _____

I understand that failure to pay these fees will result in delay in approval of the project for construction.

By signing below I hereby represent I am either : (a) the Owner of the property or project submitted to the City for review or the duly authorized agent of the Owner; and (b) that I will be personally liable for all fees due and owing the City under this Agreement.

SIGNATURE _____

(PRINT NAME)

(TITLE)

(ADDRESS)

Accepted

City Engineer



ATTACHMENT 2.2 – CONSTRUCTION PHASE SERVICES

Required items to be completed by the Project Engineer:

- I. Specific Certification Inspections
 - A. Roads
 - Erosion Control.
 - Drainage Improvements / Testing.
 - Embankment Placement / Density Control.
 - Trenching Backfill / Density Control.
 - Subgrade Line and Grade / Density Control.
 - Surfacing Line and Grade / Density Control.
 - Curbs and Sidewalks Line and Grade / Material Quality.
 -
 - B. Utility Pipe
 - Full time inspection initially, until the on-site inspector has verified the contractor's methods are within acceptable standards for trench excavation, pipe zone material placement, pipe installation, and trench backfill. Once the on-site inspector can certify the contractor's method inspection time may be reduced but testing frequencies, as per attachment 3, must be adhered to. In no case shall the on-site inspection be reduced to below half time.
- II. Review and approval of changes to approved plans including approval through the City Public Works if necessary.
- III. Record keeping and weekly reporting to the City.
- IV. Project acceptance of construction (see attachment 2).
- V. As-built survey / record drawings and side sewer reports.
- VI. Certification report.

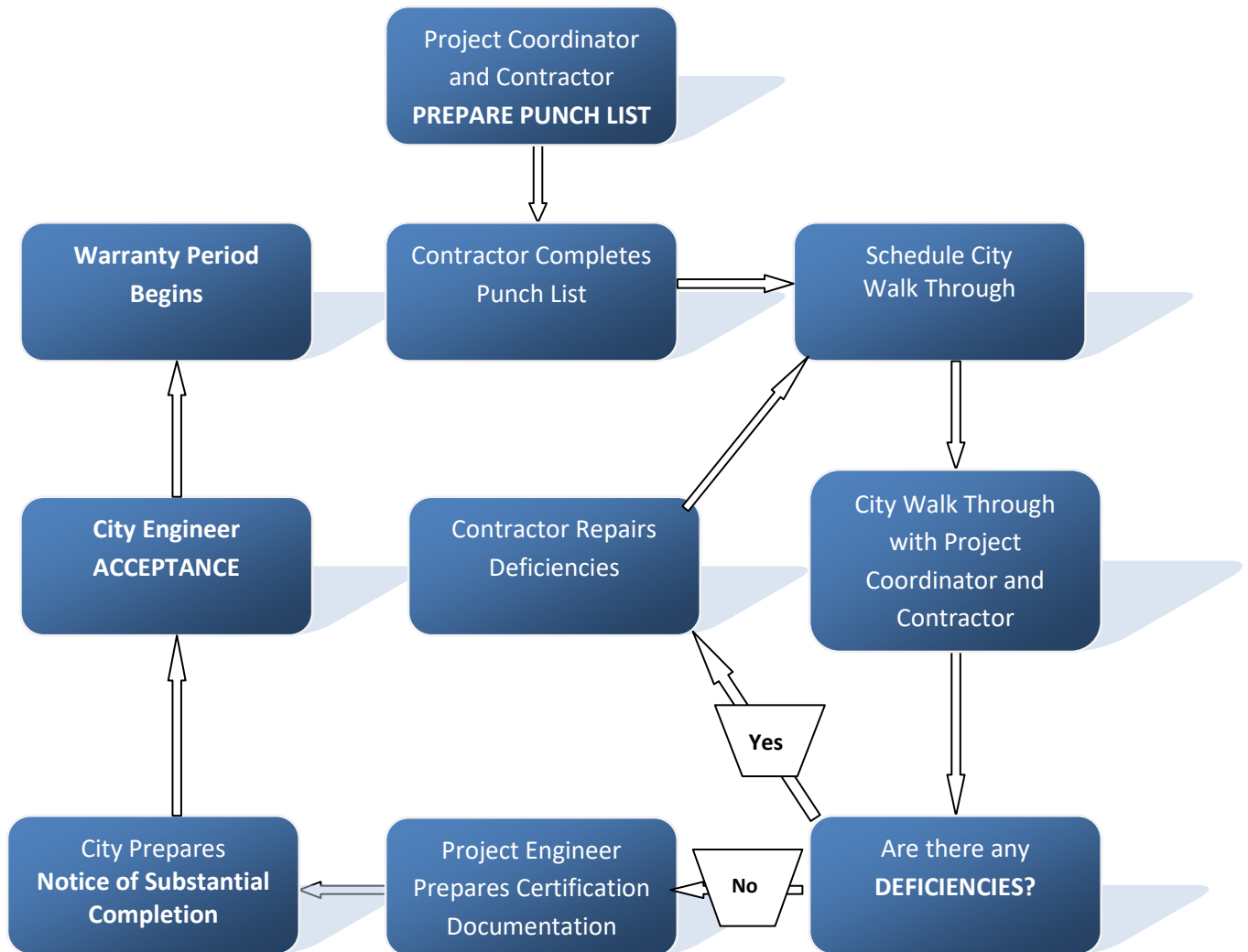
Required Items to be completed by designated Project Coordinator or Project Engineer:

- I. Pre-Construction meeting.
- II. Oversight of Construction staking (all curb, curb and gutter, and roadway alignment and grade shall be staked by a Washington State licensed surveyor).
- III. General project administration, coordination, and scheduled monitoring.
- IV. Traffic and dust control.
- V. Coordinate erosion control inspection as required by the Washington State Department of Ecology.
- VI. Response to construction complaints and resolution of complaints.



VII. Coordinate Monumentation by a Washington State licensed surveyor.

ATTACHMENT 2.3 - PROJECT ACCEPTANCE FLOW CHART





ATTACHMENT 2.4 – MINIMUM TESTING FREQUENCIES

Earth Embankment	- 1 compaction test / 1,000 CY placed
Road Subgrade	- 1 compaction test / 500 l.f. of lane or equivalent
Crushed Surfacing	- 1 compaction test / 500 l.f. / lift of lane or equivalent
Trenches	- 1 compaction test / 300 CY or 150 l.f. of trench, whichever is a higher frequency. Tests to be done at varying test depths.
Curb	- 1 compaction test / 300 l.f. of subgrade and crushed surfacing
Sidewalk	- 1 compaction test / 500 l.f. of subgrade and crushed surfacing
Concrete	- 1 set of four cylinders and 1 set of air, slump, temperature, etc. / day or / 500 CY
Aggregate	- 1 sieve analysis, % fracture count, and sand equivalent / source to verify material meets specification
HMA pavement	- 5 compaction tests per lot, minimum 5 compactions tests / day; Lot = 400 ton - 1 gradation test / 1000 tons - 1 maximum density test / 1000 tons - 1 asphalt content test / 1000 tons



ATTACHMENT 2.5 – FINAL CERTIFICATION CHECKLIST (SAMPLE)

ATTACHMENT 2.5 – FINAL CERTIFICATION CHECKLIST GUIDELINE

Project:

Certificate Head Letter:

Statement of intent to certify the project

PE Stamp and Signature

Record Drawings Electronic Drawings

PE Stamp and Signature

Lettered certification statement

Project Documents:

Daily Inspection Reports:

Field Reports:

Inspection of Asphalt Paving:

100% On site inspection during paving

Compaction Reports:

Sewer trench lifts

Water trench lifts

Utility trench lifts

Embankment

Subgrade

Crushed Rock Lifts

Material Documents: Field and Laboratory Tests:

Field Test

Lab Test

Concrete:

(Slump, Air Content, Temp)

(Break Test)

Sub-Grade:

(Compaction)

(Gradation, Proctor)

Crushed Rock:

(Compaction, Depth)

(Gradation, Proctor)

Asphalt:

(Compaction, Thickness)

(Rice, Gradation, Oil Content)

On Site Inspections of Drainage Items:

Erosion Control Measures:

Drywells:

Gutter Inlets:

Culverts:

Sidewalk Vaults:

Drainage Ditches:

Swale Volume:

Other:

Incoming / Outgoing Correspondence:

(This is a guideline of required documents, but not limited to, for final certification.)

City of Liberty Lake Engineering Design Standards



Section 3 Streets, Alleys, & Bikeways



3.0 STREETS, ALLEYS AND BIKEWAYS

Streets, alleys, bikeways, and pathways shall be designed to provide efficient and economical travel ways, including pedestrian and bicycle travel, and create a safe and pleasant environment for the citizens of Liberty Lake. An effective design shall consider the location of facilities in relation to land use, pedestrian and bicycle safety, adequate right of way width, traffic standards and safety, landscaping, drainage facilities, ease of maintenance, and the ability to provide effective and efficient public services. This section provides the specific design parameters for individual street elements.

3.1 Right of Way

- A. Public right of way widths shall be in accordance with Table 3B or as directed by the City Engineer. Minimum right of way widths are determined by the street type and may be wider if swales are needed.
- B. Narrower right of way widths may be allowed under unique circumstances at the discretion of the City Engineer via the Design Variance process. Variance requests will be evaluated based on topography, traffic condition, emergency vehicle access, zoning, existing development and on-street parking requirements.

3.2 Roadways and Alleys

- A. Street Width
 - 1. Public street widths and roadway design criteria are shown in Table 3-B. Private roads within the City limits shall be in accordance with local access road standards.
 - 2. A Half-Street is permitted as an interim facility. Half-Streets may be used pending construction of the entire street by the property owner on the opposite side of the road. When a project has frontage on an undeveloped or gravel roadway a half street improvement will be required. This will require the full improvement of the side adjacent to the project and the addition of 12 feet of the approved road cross-section and a 2 foot gravel shoulder on the side away from the development. Half-streets must be suitable for two-way traffic.

- B. Turnarounds

Turnarounds are required when dead end streets are longer than 150' to allow emergency and service vehicles to turn around. The following types of turnarounds are acceptable for public and private streets. Other turn around designs will be considered by the Director on a case-by-case basis, but must meet the most current version of the International Fire Code (IFC).

- 1. Standard Cul-de-sac: The standard cul-de-sac is preferred for construction on local access dead end streets. The radius point of the bulb is on the street centerline.
- 2. Offset Cul-de-sac: An offset cul-de-sac has a radius point offset from the centerline, with one curb being tangent to the bulb curb. Like the standard cul-de-sac, it is intended for use on local access dead end streets.
- 3. Temporary Cul-de-sac: A temporary cul-de-sac is similar to the standard cul-de-



sac but allows for planned street continuation. Curbing is not installed in the temporary cul-de-sac, and the roadway dimensions resume at the terminus in preparation of further street construction (the terminus is suitably blocked to eliminate immediate access). When the street is extended, new curbs are constructed along the roadway tangent, extending from the end points of the original curbs and the excess asphalt is removed. All temporary turnarounds shall be surfaced with an all-weather surface capable of supporting an imposed load of at least 75,000 pounds.

4. Hammerhead: The hammerhead termination may be used on local access dead ends. Construction of a hammerhead termination on local access streets is allowed only on approval of the City Engineer.
5. The following specific design criteria shall apply to the design of cul-de-sacs:
 - a. Cul-de-sac islands shall not be allowed.
 - b. Minimum curb radius for the bulb shall be 50 feet.
 - c. Minimum right of way radius for the bulb section shall be 56 feet. If the sidewalk is to be located on an easement, the minimum right of way radius is 51 feet.
 - d. Unless otherwise approved by the Engineer, cul-de-sacs shall be designed to "drain out" to the adjacent street to avoid flooding if the storm drainage system fails.
 - e. Cul-de-sac profiles shall be established to provide minimum one percent grades at all places along the gutter lines.

C. Entrance Gates

1. Proposed entrance gates shall not interfere with emergency vehicle access. An adequate fire lane must be provided. If a center island is used, a minimum 14-foot wide lane between the curb faces shall be provided. The center island shall not extend past the end of the gate when it is fully opened. In a case where there is no center island, the minimum road width is 20 feet. No parking on either side of the street will be allowed within 48 feet of the gate on both sides of the gate. The no parking zone shall be clearly signed on both sides of the gate. When fully opened, the gate shall not block access to structures or fire hydrants.
2. Gated streets require a queuing area to allow vehicles to exit the connecting street prior to the gate. The queuing area must be at least 48 feet long to accommodate fire vehicles. Queuing areas longer than 150 feet will require a public turnaround designed to City Standards.

D. Intersections

1. Arterial intersection designs are driven by the demands of the anticipated traffic flow. The minimum centerline distance between intersections shall be 150 feet.
2. Generally, intersections should be at right angles. The minimum acute intersecting angle for streets shall be 70 degrees. For stop sign-controlled streets the 70° (tangent) portion shall extend along the controlled street a minimum of 30 feet from the end of the curb radius. For all cases, the effects of sight distance shall be considered.



E. On-Street Parking

1. On-street parking shall be provided on both sides of the street for all Collector Arterial and Local Access Streets. See Table 3-B for required parking lane widths.

F. Alleys

1. All alleys shall be paved a minimum of twenty feet wide.

G. Profile Grades

1. The maximum profile grade for all public streets is 8 percent. For private streets, the maximum profile grade shall be 10 percent. A variance may be granted by the City Engineer considering topography, safety, maintainability, function, and emergency vehicle access. The minimum profile grade for all streets is 0.8 percent. Cul-de-sac profiles shall be established per section 3.2.B.
2. The profile grade at all residential intersections, along minor roadways at arterials, and for all roadways at controlled intersections shall be no greater than 3 percent at any point within 75 feet of the near end of the curb radius.

H. Horizontal Curves

1. Horizontal curves are to be determined in accordance with normal civil engineering procedures, considering design speeds, sight distances, roadway crown, building proximity, and vertical grades. A 100-foot radius shall be considered the minimum unless otherwise authorized by the Engineer.
2. The maximum superelevation on horizontal curves shall be four (4) percent. The minimum horizontal curve radii shall be determined per AASHTO Design for Low Speed Urban Streets, based on design speed, which shall be 5 mph over the speed limit, and considering the roadway crown.
3. Pavement widening on horizontal curves to accommodate large vehicles shall be considered per AASHTO Chapter III - Elements of Design, Table III-23.

I. Vertical Curves

1. Refer to Table 3-C for sag and crest vertical curve design criteria.

J. Tapers

1. The standard taper length for narrowing or offsetting of a lane shall be based on the design speed, per the U.S. Department of Transportation Manual on Uniform Traffic Control Devices (MUTCD).

K. Medians

1. Proposed medians on any roadway will be evaluated on a case-by-case basis and allowed at the discretion of the City Engineer. There shall be no parking adjacent to any median.



2. Medians, where approved, shall not exceed 600 feet in length without a break that allows emergency vehicles to cross through the median and continue in the same direction (S-Turn movement). The break in the median does not need to allow for U-turn movements.

L. Bus Zones

1. Refer to the Spokane Transit Authority Design Guidelines for bus zone design criteria.

M. Roadway Side Slopes

1. Roadway side slopes shall meet the requirements of Table 3-D; special sloping may be required to meet minimum sight distances.

N. Pavement Markings

1. Design plans for pavement markings shall be submitted to the Public Works Department for review and acceptance prior to construction. Plans shall include all existing and proposed striping, show the full width of the street, and show existing conditions beyond the proposed development. Any existing markings that are to be removed shall be clearly designated.
2. All crosswalks, stop bars and parking tees shall be thermoplastic. Centerline and shoulder striping may be painted.
3. All pavement markings shall conform to the MUTCD specifications.

O. Monuments

1. Prior to any construction within City rights-of-way, the Developer shall employ a Washington State Licensed Surveyor to conduct thorough search for all survey monuments. Any found monuments shall be referenced in accordance with current applicable state laws. A copy of the references shall be submitted to Public Works.
2. If placing new or replacing existing monuments is required the developer shall do so in accordance with current applicable state laws.
3. At a minimum, monumentation shall be provided and constructed at the following locations:
 - a. At center of each cul-de-sac
 - b. At point of intersection of all streets
 - c. At point of curvature on all horizontal curves
 - d. At point of tangency on all horizontal curves
 - e. On the roadway centerline at the end of every plat
4. When the above locations are obstructed and a monument is unable to be set, reference points shall be set in a manner where the actual monument location can be re-established.
5. The location of the monuments shall be clearly marked on the construction plans and final plat.



P. Asphalt Binder Selection

1. All Hot Mix Asphalt used in the traveled way shall use Performance Grade asphalt binders, in accordance with AASHTO Designation MP-1. The minimum base binder used shall be PG 64–28. Required base binders based on street type and condition are provided in the following table:

STREET TYPE / CONDITION	PERFORMANCE GRADE
Local Access Streets/Collector Arterials/Private Roads	64-28
Minor Arterials	70-28

Q. Pavement Section Thickness

1. All public and private roadways in the City shall be paved. A pavement surfacing design procedure must be performed for all roadways. Table 3-A may be used in place of performing a pavement design for local access streets and private roads. The design life for all roads shall be 20 years. The design procedure used must be approved by the City Engineer and must consider the following:
 - a. Traffic Loading – an estimate of the number and types of loadings that roadway will carry for the design life. This estimate of loading must be established by a procedure accepted by the Engineer and be expressed in 18-Kip Equivalent Single Axle Loads (ESAL's).
 - b. Subgrade Support—a representative value for the stiffness of the native material on which the road will be built. This value will be established by a procedure accepted by the City Engineer and be expressed as resilient modulus (MR). When determining MR, soil sampling is to include:
 - 1) Obtaining a sufficient number of soil samples which adequately represents the subgrade MR, and where significant changes in MR occur;
 - 2) Constructing a soil log to a minimum of five foot depth below proposed subgrade and classify the soil per USC; and
 - 3) Recording the location of where the samples were obtained, normally by station and offset.
 - c. Analysis- a procedure for establishing the surfacing depth requirements for a given traffic loading and subgrade resilient modulus. The City Engineer must approve this procedure. The following procedure is pre-approved: Guide for Design of Pavement Structures (26), 1994 the American Association of State Highway and Transportation Officials (AASHTO).
2. The structural pavement calculations, soil sample locations, lab results, design criteria and recommendations are to be included in a report prepared by the sponsor's engineer. All design factors used are to be listed in the report, including traffic loads projected to occur over the life of the pavement. The report is to be stamped by an engineer, licensed in the State of Washington.



3. Minimum Thickness: Regardless of the thickness computed by the design procedure, the minimum thickness of the road structural section shall be as follows:

Local Access Street:	3" Class ½" HMA 6" Crushed Surfacing Top/Base Course
Minor Arterial / Collector Arterial:	2" Class ½" HMA 2" Class 1" HMA 7" Crushed Surfacing Top/Base Course

R. Pavement Patching

The City of Liberty Lake has adopted the Spokane Regional Pavement Cut Policy which has been included in the Appendix. All pavement cuts for utility work and patches shall be designed and constructed in accordance with this policy and the City of Liberty Lake's Standards.

Table 3-A Pavement Design Matrix

SOIL TYPE Per Unified Soil Classification System (USC)	LOCAL ACCESS STREET
GW	3 inches / 6 inches
GP	3 inches / 7 inches
GM	3 inches / 8 inches
GC	4 inches / 6 inches
SW	3 inches / 7 inches
SP	3 inches / 8 inches
SM	4 inches / 6 inches
SC	Pavement Design Needed
ML	5 inches / 6 inches
CL	Pavement Design Needed
OL	6 inches / 8 inches
MH, OH, Pt	Pavement Design Needed

Notes:

1. Values listed denote asphalt over crushed rock (minimum compacted thickness) {e.g. "3 inches / 6 inches denotes 3 inches class ½" HMA over 6 inches of crushed rock.}
2. When multiple soil classifications are encountered below the planned road subgrade, if the higher-strength soil is at least 2 ft. in depth and is above the lower-strength soil, then the structural pavement section applicable to the higher strength soil can be used only for soil types GW through SM.
3. For soil types GW through SM, the upper two feet of roadway subgrade shall be compacted to 95 percent of the maximum dry density based on the AASHTO T-180 test procedure.
4. To use this table the Engineer shall acquire soil samples at the project site and classify the soils encountered. The soil classifications shall be stamped by a an engineer, licensed in the state of Washington, and shall be submitted to the City for approval.

**Table 3B - Roadway Requirements and Widths**

FEATURE	MINOR ARTERIAL	COLLECTOR ARTERIAL	LOCAL ACCESS
Sidewalk	Required Both Sides Min. 5'	Required Both Sides Min. 5'	Required Both Sides Min. 5'
On-Street Parking	Not Required	Required Both Sides Min. 8'	Required Both Sides Min. 8'
Exterior Thru Lane	Required Min. 12'	Required Min. 12'	Required Min. 12'
Interior Thru Lane	Required Min. 12'	Not Required	Not Required
Two Way Left Turn Lane	May be Required Min. 12'	May be Required Min. 12'	Not Required
Bike Lane	Required Both Sides Min. 5'	Required Both Sides Min. 5'	Not Required
Minimum Curb to Curb Width	58'	50'	40'
R.O.W. Widths	80'	60'	50'

¹ Variances from the above standards may be granted via Design Variance, on a case-by-case basis by the City Engineer based on the length of proposed street, traffic circulation, traffic volumes, location, alternate routes, and the ability of emergency services to access the site.

² Actual right of way widths will be determined based on the proposed lane configurations for each roadway and may exceed the minimum widths specified. Border Easements may be allowed for sidewalk and pedestrian buffer strips (which do not include drainage treatment facilities) in lieu of right of way dedication.

Table 3C - Vertical Curve Design Parameters

	MINOR ARTERIAL	COLLECTOR ARTERIAL
MINIMUM DESIGN SPEED¹	35 mph	35 mph
Vertical Curves are required if the Algebraic Grade Difference, A, is:	A>1%	A>1%

	ALLEY	BICYCLE/ PEDESTRIAN PATHWAY
MINIMUM DESIGN SPEED¹	20 mph	20 mph
Vertical Curves are required if the Algebraic Grade Difference, A, is:	A>2%	A>2%

CREST		SAG	
DESIGN SPEED	"K" Factor ²	DESIGN SPEED	"K" Factor ²
20 mph	167>K>10	20 mph	167>K>20
25 mph	167>K>20	25 mph	167>K>30
30 mph	167>K>30	30 mph	167>K>40
35 mph	167>K>50	35 mph	167>K>50
40 mph	167>K>80	40 mph	167>K>70

$$L = KA$$

Where: L = Length of Curve

K = "K" factor

A = Algebraic Difference between grades

K = "K" factor

A = Algebraic Difference between grades

K = "K" factor

¹ Design speed is posted speed plus 5 mph. In practice, speeds may be less or more than shown depending on other design factors not accounted for herein. The design engineer shall justify the use of values other than those listed above.

² Minimum "K" as defined in AASHTO, is used to find minimum curve length for sight distance. Maximum "K" used to find maximum curve length for drainage.



Table 3D - Side Slopes

	MINOR ARTERIALS	COLLECTOR ARTERIALS	LOCAL ACCESS
GRADE BREAK AT BACK OF WALK			
up	4:1	4:1	2:1
down	4:1	4:1	2:1
GRADE BREAK AT ONE FOOT BEHIND WALK			
Up	2:1	2:1	2:1
down	2:1	2:1	2:1
	ALLEYS	BICYCLE/ PEDESTRIAN PATHWAY	
GRADE BREAK AT EDGE OF PAVEMENT			
up	2:1	2:1	
down	2:1	2:1	
GRADE BREAK AT EDGE OF TRAVELED WAY, INCLUDING ANY SHOULDERS			
up	2:1	2:1	
down	2:1	2:1	

Notes:

1. Use WSDOT standards when curbs do not exist.
2. Grades shown are horizontal:vertical

Table 3-E - Street Profile Grades

	MINOR ARTERIAL	COLLECTOR ARTERIAL	LOCAL ACCESS	ALLEYS
MINIMUM PROFILE GRADE	0.8%	0.8%	0.8%	0.8%
MAXIMUM PROFILE GRADE	8.0%	8.0%	8.0%	10.0%

Notes:

1. Cul-de-sac profiles shall be established to provide minimum one percent grades at all places along the gutter lines.
2. Unless otherwise approved by the Engineer, the profile grade at all residential intersections, along the minor roadway at arterials, and for all roadways at controlled intersections shall be no greater than three percent at any point within 75 feet of the near end of the radius.

Table 3-F - Curb Radii Design Parameters

Actual return geometry must be able to accommodate the minimum design vehicle with the appropriate lane encroachment constraints.

MINIMUM DESIGN VEHICLE

Local Access	SU-30 or P
Collector Arterial	WB-40
Minor Arterial	WB-40

Notes:

1. Minimum design vehicle is determined as a function of the most restrictive zoning.
2. Source: Intersection Channelization Design Guide, National Cooperative Highway Research Program Report 279, 1985.



MINIMUM ALLOWABLE SIMPLE CURB RADII

FROM:	TO:		
	LOCAL ACCESS	COLLECTOR ARTERIAL	MINOR ARTERIAL
PRIVATE ROAD	20	30	30
LOCAL ACCESS	20	30	30
COLLECTOR ARTERIAL	30	30	30
MINOR ARTERIAL	30	30	30

Notes:

1. Minimum simple radii may not accommodate all vehicles. It may be necessary to use appropriately dimensioned two or three-centered curves.
2. Lane encroachments are not allowed on turning movements into principal and minor arterials, except where turning movements are subject to 4-way stop control or phased signalization.

3.3 Curbs, Gutters, Pedestrian Buffer Strips, Driveways and Sidewalks

A. Curbs and Gutters

1. Integral cement concrete curb and gutter shall be constructed per the City standards on all new construction. Curbs shall be constructed on 4" of Crushed Surfacing Top Course compacted to 95 percent of the maximum dry density. Special drainage issues may require the use of other curbing with gutter grading, upon approval of the Engineer. When repairing or replacing existing sections of curb, the type of curb constructed may match the adjacent curb.
2. The curb radius at alley entrances shall be 5 ft. Refer to Table 3-F for minimum simple curb radii on streets.
3. The actual curb return geometry must be able to accommodate the minimum design vehicle, as shown in Table 3-F, with the appropriate lane encroachment constraints.

B. Sidewalks

1. Curbs and sidewalks shall be required to be permitted and constructed within the City right-of-way on City access and arterial streets and within private road easements where the same are not already in existence, or the same are in a state of disrepair, as declared by the City Engineer. The required sidewalk construction / repair shall be on all sides of private property parcels adjacent to City streets whenever any permit is issued for new construction or for substantial improvements to a parcel, or any improvements resulting in a change of occupancy classification. Locations of sidewalk placement or repair shall be included on plans submitted to Public Works for review. All Detectable Warning Surface plates shall be cast iron.
Sidewalks shall be constructed with a width of 6' and a cross slope of 2% or 1/4" per foot. Sidewalks shall be constructed on 4" of Crushed Surfacing Top Course compacted to 95 percent of the maximum dry density. Sidewalks shall be designed in accordance with the Standard Plans and City of Liberty Lake design specification.



3. Elevated structural sidewalks shall be designed in accordance with the applicable portions of the latest edition of the Uniform Building Code. The minimum concentrated load, L, to be used in the design shall be 10,000 pounds applied over a contact area of 100 square inches. The minimum single axle load shall be 20,000 pounds. The design tire load shall be 600 pounds per inch of tire width.

C. Pedestrian Buffer Strips

1. Pedestrian Buffer Strips can be hard surfaced or planted depending on the location. Pedestrian Buffer strips shall be at least 4.5 feet wide. Hard surfaces include concrete, bricks and other pavers.
2. If roadside swales are proposed to treat stormwater runoff, the pedestrian buffer strip must be at least 10 feet wide with a maximum slope of 3:1. In situations where a separation between the sidewalk and the street is constrained by topography, narrow right of way, or existing development, a variance from this standard may be granted by the City Engineer.

D. Curb Ramps

1. Curb ramps shall be designed in accordance with the requirements of ADAAG, the WSDOT Standard Specifications, and the City of Liberty Lake Standard. Curb ramps shall be located in accordance with the City of Liberty Lake Standard Plans.

E. Driveway Approaches

1. Approaches shall be constructed to define the access openings in accordance with the City of Standard Plan sheets entitled "Cement Concrete Approaches". Driveway approaches must provide access to an off road parking area located on private property. The driveway shall be of sufficient length so a vehicle in the driveway does not project into the road right-of-way, sidewalk, or pathway. Driveway approaches shall be constructed to avoid interference with existing drainage inlets, culverts, road lighting standards, utility poles, traffic regulating devices, fire hydrants, curb ramps, or other public facilities. The applicant shall bear the cost of relocating any such public facility. The City Department holding authority for the particular structure shall decide how the facility will be located. Where the City Engineer deems that these standards will not provide the proper control of access or safety, additional requirements may apply to insure public safety. All driveways must demonstrate adequate sight distance.
2. These approach standards are general in nature and pertain mainly to local access road situations. Arterials, railroad crossings, signalized intersections, channelization, and findings from a specific traffic analysis may result in superseding requirements. Refer to the Standard Plan entitled "Cement Concrete Approaches" for approach dimensions

F. Residential Approaches

1. Residential driveway approaches shall not exceed 20 feet in width for a two-car garage and 28 feet for a three-car garage. The total width of all driveway approaches on a road for any ownership shall not exceed 40% of the frontage of that ownership along the road and shall not be more than two in number. Refer



to the Standard Plan entitled “Cement Concrete Approaches” for approach dimensions. Any project or alteration of the existing approaches will require conformance with these standards along with replacement of any unused approaches with standard curb, gutter, and sidewalk. Driveways shall not be constructed, reconstructed, or altered to be within 50 feet of the end of a curb return for an intersection. Driveway approach grades within right of way shall not exceed 8% (a rise or descent of 8 feet in 100 feet) in the urban area.

2. Where the existing curb, gutter, or sidewalk is not continuous along the road frontage, the Project Sponsor shall construct the missing improvements.

G. Commercial / Industrial Approaches

1. Driveways and site development within commercial and industrial zones shall be arranged to allow vehicles to exit without backing out into the roadway. The minimum width of a driveway within a commercial or industrial zone shall be 24 feet. The maximum driveway approach width within a commercial or industrial zone shall be 35 feet, but only for uses where large trucks are anticipated. Each lot shall be allowed one driveway approach per street, unless the lot width exceeds 150 feet, in which case two driveway approaches may be approved. Shared driveways between adjacent properties is encouraged, but not required. Prior to construction, the owner shall provide evidence of a joint use, access, and maintenance agreement. Driveways shall not be constructed, reconstructed, or altered to be within 75 feet of the end of a curb return for an intersection or within 75 feet of a theoretical curb return end in standard location, if not present. Driveway approach grades within right of way shall not exceed 8% (a rise or descent of 8 feet in 100 feet).
2. The spacing between driveway approaches in the curb line of ownerships or leaseholds shall not be less than thirty (30) feet for commercial uses or less than fifty (50) feet for industrial uses measured parallel with the frontage. Driveway approaches should be consolidated and shared to the extent possible

H. Driveways

1. Driveway locations shall be designed to provide for safe operations and minimal disruption of traffic flow. In general, the higher the street classification, the fewer the number of access points that are allowed. In areas of high-density housing, shared driveways are encouraged. Multiple unshared driveways that have minimal separation between them are discouraged.
2. The following criteria will be considered when reviewing a proposed driveway:
 - a. Land use
 - b. Design vehicle and site needs
 - c. Street classification
 - d. Street operational characteristics
 - e. Level of improvement on adjacent street
 - f. Distance from existing or proposed traffic control devices
 - g. Distance from intersections or other driveways
 - h. Potential exposure for pedestrians and bicycles
 - i. Sight distance
3. Driveway approaches shall be designed and constructed in accordance with the standard plan. A deviation may be granted for truck movements in commercial areas.
4. In new developments, driveway locations shall be shown on street plans. Deed



restrictions may be required where drainage facilities or emergency turnarounds are dependent upon driveway placement.

I. Roadside Planting

1. Any roadside planting shall conform to the City's clearances/clear zone standards as discussed in Section 3.5. Planting, removal, or pruning of any street tree shall be in accordance with Liberty Lake Ordinance Title 8 Chapter 6. All projects requiring landscaping within or affecting the public right-of-way shall submit a landscaping plan for review by Public Works.

J. Existing Street Trees

1. When development occurs on sites with existing street trees, the following items must be addressed as part of the project:
 - a. All dead or diseased trees must be removed and replaced at the discretion of Public Works.
 - b. Trees that are missing shall be replaced at the discretion of Public Works
 - c. Broken or missing irrigation systems shall be repaired or replaced.
 - d. Broken or missing tree grates shall be repaired or replaced.
 - e. All concrete tree grates shall be replaced with metal grates meeting ADA requirements.
 - f. When structural sidewalk is removed and backfilled, concrete planter vaults shall be removed and replaced with metal culverts 6' in diameter by 3' depth as approved by Public Works.
 - g. Gaps between the tree grate and the soil surface exceeding 2 inches shall be filled in with a material approved by Public Works.
 - h. Tree grates that are not flush with the surrounding sidewalk shall be raised or lowered as necessary to prevent a tripping hazard.
 - i. No new utility pole location shall be established closer than 5 feet to an existing tree;

K. New Street Trees

1. Tree selection shall be coordinated through the Public Works Department. Approval shall be obtained from the City Engineer prior to planting tree(s) in the City right of way.
2. When locating street trees, the following specific criteria shall apply:
 - a. Street tree installations shall meet all City of Liberty Lake visibility requirements.
 - b. Street trees installed in tree pits or sidewalk cutouts shall be located so as to not interfere with street signs, lighting poles, utility wires bus stops or pads and to accommodate ADA pedestrian requirements.
 - c. Minimum horizontal distances from the centerline of a tree to other structures or improvements in the planting strip shall be as follows:
 - 1) 15 feet to edge of driveway;
 - 2) 25 feet to street light luminaire (15 feet may be allowed where lighting pattern is not affected);
 - 3) As required to provide an adequate clear sight triangle as per LLMC 21.46;
 - 4) 5 feet to underground duct or pipe;
 - 5) 10 feet from curb cut for drainage;



- 6) 20 feet from drywell;
- 7) 15 feet to hydrants and utility poles
- d. Trees that are suitable for wet areas shall be selected for planting within grass percolation areas. Trees that are planted within grass percolation areas shall not interfere with, obstruct, or retard the flow of water within the swale.
- e. Spacing of street trees will be determined by Public Works.
- f. If trees are to be planted in an area with no planting strip, the following criteria shall apply:
 - 1) A permanent, hard walking surface at least four feet wide shall be provided between the tree well or planting area and any structure or obstruction.
 - 2) Sidewalk cuts in concrete for tree planting shall be at least 44" x 44" to allow air and water to the root area.
 - 3) In cases where the existing walk cannot meet the four foot width requirement after tree planting, additional sidewalk width must be added within street right of way or easement, or the tree position must be modified.
- g. Irrigation systems shall be required for all areas where street trees are planted.
- h. Deviation from these Standards will be considered via the Design Variance process.

3.4 Signing and Illumination

A. Street Signs

- 1. All existing and proposed street signs required as part of street design shall be shown on the plans submitted to Public Works and shall be subject to review and approval by the City Engineer. The plans shall include all existing and proposed signs, show the full width of the street, include any signs on the opposite side of the street, and show existing conditions beyond the proposed development.
- 2. All traffic control devices (TCD), including, but not limited to regulatory signs, warning signs, and guide signs shall adhere to the manual on Traffic Control Devices (MUTCD) standards. Refer to the City of Liberty Lake Standard Plans for street name signs construction requirements.

B. Sign Posts

- 1. Refer to the City of Liberty Lake Standard Detail Index for street sign post construction requirements.

C. Street Lighting and Traffic Signalization

- 1. Design of street lighting and traffic signalization shall be submitted to Public Works and shall be subject to review and approval by the City Engineer. Street lighting plans shall be provided on arterials. If pedestrian or street lighting is proposed elsewhere, a lighting plan must be submitted to Public Works for review prior to construction.



3.5 Clearances/Clear Zones

A. Vertical Clearances

- The clearance above any street surface shall be a minimum of (16 ½) feet to overhead obstacles and 13 ½' for trees. This height shall be maintained across the full width of the street, extending two feet behind the face of curb.
1. The clearance above sidewalks shall be a minimum of eight (7.5) feet to overhead obstacles. Shrubs and other items shall not extend into the sidewalk area.

B. Horizontal Clearances

1. The clear horizontal sight distance triangle at intersections shall be as described in AASHTO "A Policy on Geometric Design of Highways and Streets", Chapter 9, section on Sight Distance, and Section 10-3B-2N of the City of Liberty Lake Development Code.

C. Clear Zones

1. The term "clear zone" is used to designate the unobstructed area provided beyond the edge of the travel way on a public road for the recovery of errant vehicles.
 - a. On shouldered roads, rigid objects shall be placed no closer to the travel way than the clear zone distance as described in the current edition of AASHTO's "Roadside Design Guide". Within the clear zone, all hazards shall be protected by traffic barriers. In lieu of barriers, hazards may be constructed flush with the surface.

3.6 Bikeways and Off-Road Pathways

- #### A. Bicycle facilities shall be constructed where designated in the City's Comprehensive Plan, and shall be designed in accordance with City Standards. Side slopes adjacent to bikeways shall meet the requirements of Table 3-D. Where shared pedestrian/bicycle pathways are constructed, the minimum width shall be 10 feet.

B. Off-Road Multi-Use Pathways

1. All off-road pathways shall be constructed as multi-use pathways and designed to accommodate, at a minimum, pedestrians and bicyclists. To promote multi-use compatibility and public safety, all public and private off-road multi-use pathways shall be constructed in accordance with the design standards below. Design drawings demonstrating compliance with said standards shall be submitted to the City of Liberty Lake for review and approval prior to construction. Deviations to these design standards may only be permitted with the approval of the City Engineer.
 - a. Width: The minimum width of all off-road pathways shall be 10 feet.
 - b. Construction: The pathway pavement may be constructed of either asphalt or concrete.



- c. Section: Asphalt shall be a minimum of two inches thick over four inches of crushed gravel, on a compacted subgrade. Concrete shall be four inches thick over two inches of crushed gravel, on a compacted subgrade.
- d. Shoulders: The pathway shall include a minimum of one-foot level shoulders on each side.
- e. Clearing: Trees and brush shall be cleared a minimum of fourteen feet (two feet each side of the pathway to a height of ten feet.
- f. Alignment: The pathway alignment shall follow the natural terrain of the land so as to minimize grading.
- g. Drainage: A discernable drainage ditch shall be constructed on the uphill side of a pathway. Culverts shall route stormwater runoff to the lower side of the trail to natural drainage ways.
- h. Grade: The maximum sustained grade shall be 12%. 15% grades may be allowed for short sections.
- i. Line of Sight: Minimum of 85 feet for grades less than 10% and 50 feet for grades greater than 10%
- j. Side Slopes: Pathways with downhill side slopes greater than 2:1 may, at the City Engineer's discretion, require protective measures such as fencing.
- k. Pullouts - Pullouts ten feet wide and 16 feet long should be constructed at significant lookout areas to allow for rest and aesthetic opportunities.

3.7 Pavement Cuts and Patches

The City of Liberty Lake has adopted the Spokane County / City of Spokane Regional Pavement Cut Policy as its standard for the cutting and patching of existing roadways.

City of Liberty Lake Engineering Design Standards



Section 4 Stormwater Management



4.0 STORM WATER MANAGEMENT

The City of Liberty Lake has adopted the "Spokane Regional Stormwater Manual" (SRSM) as its standard for the design and construction of stormwater collection and disposal facilities. The requirements outlined in this section shall supersede those described in the SRSM.

Erosion and Sediment Control Plans are required for projects or activities which could potentially cause significant excess runoff, erosion, or water quantity/quality impacts. Refer to Section 9.0 of the Spokane Regional Stormwater Manual for Erosion and Sediment Control Plan requirements.

4.1 Methods of Stormwater Conveyance and Disposal

A. Storm Sewers

1. Storm sewer design shall be in accordance with the requirements of the SRSM, with the following additions and exceptions:
2. Horizontal Alignment: Storm sewers shall generally be located in the roadway at the center of a travel lane or on the lane line as to avoid manhole placement under the vehicle tire path.
3. Minimum pipe cover shall be three feet for PVC pipe and one foot for ductile iron pipe.
4. Catch Basins: Design water surface for storm sewer catch basins shall be a minimum of six inches below the gutter grade at the inlet.
5. Storm water inlets shall be designed for the condition where the inlet is half-plugged with sediment and debris.
6. The roughness coefficient $n = 0.013$ shall be used for all PVC, concrete and ductile iron storm sewer pipe. The variable - n curve shown in Figure 4-1 shall be used for design.
7. The minimum velocity in storm drainage pipes is 2.5 feet per second for the design storm.
8. In addition to storm water, noncontact cooling water and some unpolluted industrial process wastewaters may be discharged to a storm sewer upon approval of the City Engineer and the Washington State Department of Ecology. Discharge of any other wastewater into a storm sewer is not allowed.

B. Combined Sewers

1. Combined sanitary and storm sewers are prohibited. No storm sewer or storm drainage structure may be connected to a sanitary sewer.

4.2 Stormwater Drainage in the Public Right of Way

A. Draining Stormwater from the Public Right of Way to Private Property

1. Plat dedications, property conveyance or easements to the City are required for construction of swales on private property for the purpose of draining stormwater from the public right-of-way. Covenants shall be established to prohibit alteration or filling in of swale areas. Adjacent property owners shall be required to maintain the swale areas within an easement and provide access for City maintenance personnel. The City shall be held harmless from all damages as a result of stormwater draining from the public right-of-way to the swales.